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TUBERCULOSIS

The problem of tuberculosis, dormant for a number of years, is beginning to worry public health officials again. After decades of declining figures -- 22,201 cases in 1985, the lowest annual total in 60 years -- the number of TB cases has slowly begun to creep up again, 17,528 active cases reported in 1999. Society's problems -- AIDS, poverty, homelessness, alcohol, and drug abuse -- and other factors are reversing the previous downward trend and reviving memories of the days when TB was a major health threat.

In the 19th century, this formidable enemy claimed more lives in this country than any other disease. The number of Americans who contracted TB declined sharply after 1900 due to a better understanding of the disease and improved hygiene, but the death rate was still high: TB was responsible for 5 million deaths in the first half of the 20th century. As late as 1954, more than 110,000 hospital beds were devoted to the care of TB patients alone in the United States. With a few exceptions in research-related institutions, today there are none.

The discovery of streptomycin in 1944 and Isoniazid (INH) in 1951 put TB sanitariums and hospitals out of business. It was at last possible to successfully treat a disease -- in most cases at home rather than in the hospital -- that had been around since prehistoric times.

Airborne Transmission

TB is usually caused by repeated exposure -- usually at home or at work -- to droplets contaminated with tubercle bacilli (a species of rod-shaped bacteria) that are expelled into the air when a person with active pulmonary TB coughs, sneezes, or even sings, speaks or laughs. The TB bacteria (Mycobacterium tuberculosis) in these excretions are so tiny that they dry out and float on air currents and may survive for long periods in an enclosed space. Contrary to popular belief, TB is not likely to be transmitted through personal items belonging to those with TB, such as clothing, bedding, or other items they have touched, according to the American Lung Association.

Even when exposed to TB, most people who breathe in the bacteria don't become infected. Of those who do, most don't develop active disease; instead, the TB bacilli may lie dormant in the cells lining the lungs' air sacs, where the body may wall them up in tiny, hard, grayish capsules, or tubercles. (TB can spread to other parts of the body, but the most common site are the lungs.) From then on, a lifelong balance between the infection and the infected may be maintained. If the body's resistance is lowered because of aging, illness, fatigue, malnutrition, alcoholism, or other factors, this balance may be upset, allowing bacteria to break out of the tubercles and enter the bloodstream, causing active TB.

It is estimated that 10 million to 15 million Americans are among the 1.7 billion people worldwide who are TB carriers but are not infectious to others. About 90 percent of TB cases in this country occur when a dormant infection awakens and develops into active TB; only 10 percent result from a newly acquired infection. Of all infected people, 5 percent will develop the disease within a year, while another 5 percent will develop TB later on in their lives according to the Centers for Disease Control.

TB experts still don't know why most people who have been infected with the TB organism don't ever develop active disease, why some people develop active disease immediately, and why most cases occur among people who became infected earlier.

TB Cases Rise

The current epidemic of the human immunodeficiency virus (HIV) is one of the main reasons for the increase in new cases. People with both TB and HIV infections are at substantially greater risk of developing active tuberculosis than are people infected with the TB organism but who are not HIV-infected. The World Health Organization estimates that worldwide, about 3 million people with HIV infection are also TB-infected. Those with HIV infection, who come from areas where TB is endemic, such as parts of Latin America, sub-Saharan Africa, and southeastern Asia, are at high risk for TB. The growing numbers of homeless are also contributing to rising statistics. Up to 6.8 percent of America's homeless are believed to have active TB, and about 50 percent have latent TB infection, according to the National Centers for Disease Control. Homeless shelters, experts believe, may provide a fertile breeding ground for the disease. Increasing enrollment of the elderly in nursing homes is also leading to the rising incidence of TB. Factors leading to a greater number of cases, either by increasing the risk of exposure to TB or affecting the body's ability to fight the disease are:

1. crowded living conditions
2. poor nutrition
3. poverty
4. stress
5. drug use
6. alcoholism
7. immigration from areas where TB is common

Signs and Symptoms of Active Tuberculosis are:

1. a cough lasting longer than three weeks
2. coughing up blood or sputum
3. pain in the chest
4. weakness or fatigue
5. loss of appetite
6. unexplained weight loss
7. fever
8. night sweats

Testing for TB

Gone are the days when all American school children were routinely tested for TB. Who can forget the tine test, in which a four-pronged device containing a substance called tuberculin punctured tender forearms? Or how the school nurse examined those forearms a few days later?

A TB skin test is the only way to find out if you have TB infection. You can get a skin test at the health department or at your doctor's office. You should get tested for TB if

- you have spent time with a person with infectious TB

- you have HIV infection or another condition that puts you at high risk for TB disease
- you think you might have TB disease
- you are from a country where TB disease is very common (most countries in Latin America and the Caribbean, Africa, and Asia, except for Japan)
- you inject drugs
- you live somewhere in the U.S. where TB disease is common (most homeless shelters, migrant farm camps, prisons and jails, and some nursing homes)

Experts believe the Mantoux test -- in which a substance called purified protein derivative (PPD) is injected under the skin of the forearm and examined about 48 to 72 hours later -- is more reliable than the TINE test (four-pronged). A swelling of the area suggests that the person may have been infected with TB bacteria (not the redness). But this doesn't necessarily mean that the person has the active disease. It is also possible that the reaction may be due to infection with non-tuberculosis but related bacteria.

Testing Recommendations

Common sense would dictate that anyone with symptoms or who has been in close contact with someone with active TB should have a skin test, which can be administered either by private physicians or in public clinics. TB skin-testing is mandatory in certain states and counties for immigrants and students from Africa, Asia and Latin America, as well as for personnel in schools, hospitals, correctional facilities, food-handling establishments, group homes, child-care facilities, and substance abuse centers.

Skin tests are also recommended for senior citizens. "Elderly people, especially those in nursing homes, who happen to be infected, but have not developed [active] disease, may, in fact, as they become more debilitated or develop some other concomitant illness, have that infection break down and develop into active disease," said a spokesperson for CDC's division of tuberculosis control.

At present, screening of children entering kindergarten or day-care centers is not required in all school jurisdictions, but CDC recommends that school children be tested for TB to ensure that all U.S. citizens are tested at least once in their lifetimes.

Diagnosis

If a person has a significant reaction upon being tuberculin skin-tested for the first time, additional laboratory and x-ray examinations are necessary to determine if the individual has active TB. Once infected, most persons will generally test positive for the rest of their lives. TB can mimic some other diseases, such as pneumonia, lung abscesses, tumors, and fungal infections, or occur along with them. Proper diagnosis, therefore, will rely on symptoms and other physical signs, a person's history of exposure to TB, and x-rays that may show evidence of TB infection, usually in the form of lesions or cavities in the lungs. TB bacilli grown in cultures of sputum or other specimens provide a positive diagnosis.

How TB Is Treated

Isoniazid, or INH, is TB's wonder drug. Inexpensive, effective, easy to take, it can both prevent and help cure TB. CDC and the American Thoracic Society recommend preventive treatment, which consists of one pill of INH each day for at least nine months, for individuals who have:

1. close contact with a person with infectious TB
2. positive tuberculin skin test reaction and an abnormal chest x-ray that suggests inactive TB
3. a tuberculin skin test that converted from negative to positive within the past two years
4. a positive skin test reaction and a special medical condition (for example, AIDS or HIV infection or diabetes) or who is on corticosteroid therapy
5. a positive skin test reaction, even with none of the above risk factors

Adverse Effects

It's no wonder that drugs powerful enough to knock out tough TB bacteria can also have serious adverse reactions. The most commonly used anti-TB drugs -- INH, rifampin and pyrazinamide -- can cause liver damage. Before they are administered, tests to measure liver enzymes and kidney function and other blood tests should be run, to serve as baselines for later comparison. INH is especially dangerous to alcoholics and older adults, while rifampin interferes with the action of a number of widely used drugs, such as digitalis, certain anticoagulants, oral contraceptives, and diabetes drugs.

Vaccine

A vaccine for tuberculosis, called BCG for Bacille-Calmette-Guerin, is available but not widely used in the United States. Made from live, but weakened, cow tubercle bacilli, the vaccine didn't protect adults against pulmonary TB in a large clinical trial in India. However, because it appears to offer some protection to children, the World Health Organization recommends its use for newborns in developing countries.

Final Thought

Tuberculosis poses a serious health threat to the public. However, testing relatively simple, and routine screening of those at risk can help identify and protect both the individual and those around them. Treatment of a TB infection can prevent the progression to active TB and serious medical complications.

Do your part, get tested, and if necessary get treated early. Prevent the spread of TB!

For more information about TB, contact Community Health Nursing, Preventive Medicine Service at 202-782-3964. Free literature, counseling, and referral for TB testing are also available. We are located on the 3rd floor of building 1, Walter Reed Army Medical Center, room B303.

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